

Sr-90. Samples with total Sr results that exceeded the clean-up goals for Sr-90 were then subject to isotopic Sr-90 analyses. If sample results were greater than or equal to the Sr-90 clean-up goal, they were analyzed for Pu-239 by alpha spectroscopy consistent with the SAP. No samples were analyzed for Pu-239 where there was not an exceedance for Sr-90.

Soil samples were collected as specified in the TSP (ITI Gilbane, 2013c) and in accordance with the SAP attached to the Execution Plan (ITSI Gilbane, 2013b). Systematic soil sampling results are discussed in Section 9.4.

5.5 BIASED SAMPLING

Biased soil sampling was conducted at suspect locations based on the GWS data to investigate scan data that exceeded the project investigation levels. Biased soil sampling results are discussed in Section 9.4.

5.6 SURVEYS OF REMAINING SHIP BERTH STRUCTURES

Remaining ship berth structures, such as concrete infrastructure, bollards, and cleats were surveyed for surface contamination in accordance with the TSP (ITSI Gilbane, 2013c). In performing the surveys, elevated alpha activity was encountered which could not be readily explained by radon and was not suspected to be due to contamination. The elevated alpha activity was found consistently on or near heavily weathered (i.e., rusted) metal surfaces. A sample consisting of metallic shavings, rust particles, and paint scraped from bollards was collected and analyzed. Neither Ra-226 nor Pu-239 was detected in the sample. Therefore, the elevated alpha surface activity was not due to contamination by alpha-emitting radionuclides of concern. The only alpha-emitting radionuclide detected above the MDC was polonium-210 (Po-210), whose activity accounted for 80 percent of the reported gross alpha activity. The presence of Po-210 cannot be attributed to legacy Navy operations (i.e., due to Ra-226 contamination) in the absence of other alpha-emitting Ra-226 progeny that also should be present under conditions of secular equilibrium. However, its presence is not unexpected due to radon decay in the environment and its long half-life (140 days) relative to other radon progeny. The plate-out of Po-210 on outdoor metal structures is a recognized phenomenon that is readily observable primarily on galvanized metal surfaces or metal that is rusty, oxidized, or weathered.

A technical memorandum was prepared and approved by the Navy that allows for a correction factor to be used with total alpha surface activity measurements of weathered outdoor metal surfaces, such as pier components at HPNS, to remove the alpha activity contribution from the plate-out of Po-210 (radon progeny). This technical memorandum is found in Appendix A.